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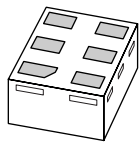
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Kind regards,

Team Nexperia



PESD3V3L5UK; PESD5V0L5UK

Low capacitance unidirectional fivefold ESD protection diode arrays

Rev. 1 — 25 August 2010

Product data sheet

1. Product profile

1.1 General description

Low capacitance unidirectional fivefold ElectroStatic Discharge (ESD) protection diode arrays in a leadless ultra small SOT891 Surface-Mounted Device (SMD) plastic package designed to protect up to five unidirectional signal lines from the damage caused by ESD and other transients.

1.2 Features and benefits

- ESD protection of up to five lines
- Low diode capacitance
- Max. peak pulse power: $P_{PP} = 30\text{ W}$
- Low clamping voltage: $V_{CL} = 9.5\text{ V}$
- AEC-Q101 qualified
- Very low leakage current: $I_{RM} = 0.5\text{ }\mu\text{A}$
- ESD protection up to 20 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5 (surge); $I_{PP} = 3.2\text{ A}$

1.3 Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- Communication systems
- Portable electronics
- Subscriber Identity Module (SIM) card protection

1.4 Quick reference data

Table 1. Quick reference data

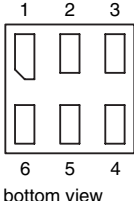
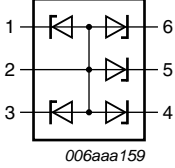
$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|--------------------------|--------------------------------------|-----|------|-----|------|
| Per diode | | | | | | |
| V_{RWM} | reverse standoff voltage | | | | | |
| | PESD3V3L5UK | | - | - | 3.3 | V |
| | PESD5V0L5UK | | - | - | 5.0 | V |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 0\text{ V}$ | | | | |
| | PESD3V3L5UK | | - | 20 | 24 | pF |
| | PESD5V0L5UK | | - | 18.5 | 22 | pF |



2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|-------------------|---|--|
| 1 | cathode (diode 1) |  <p>bottom view</p> |  <p>006aaa159</p> |
| 2 | common anode | | |
| 3 | cathode (diode 2) | | |
| 4 | cathode (diode 3) | | |
| 5 | cathode (diode 4) | | |
| 6 | cathode (diode 5) | | |

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|---|---------|
| | Name | Description | Version |
| PESD3V3L5UK | - | plastic extremely thin small outline package; | SOT891 |
| PESD5V0L5UK | - | no leads; 6 terminals; body 1 × 1 × 0.5 mm | |

4. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PESD3V3L5UK | P4 |
| PESD5V0L5UK | P5 |

5. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|------------------|--------------------|--------------------------|--------|-----|------|
| Per diode | | | | | |
| P _{PP} | peak pulse power | t _p = 8/20 μs | [1][2] | - | |
| | | | | 28 | W |
| | | | | 30 | W |
| I _{PP} | peak pulse current | t _p = 8/20 μs | [1][2] | - | |
| | | | | 3.2 | A |
| | | | | 3.1 | A |

Table 5. Limiting values ...continued

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-------------------|----------------------|------------|-----|------|------|
| Per device | | | | | |
| T _j | junction temperature | | - | 150 | °C |
| T _{amb} | ambient temperature | | -55 | +150 | °C |
| T _{stg} | storage temperature | | -65 | +150 | °C |

[1] Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.

[2] Measured from pin 1, 3, 4, 5 or 6 to pin 2.

Table 6. ESD maximum ratings

T_{amb} = 25 °C unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Max | Unit |
|------------------|---------------------------------|-----------------------------------|--------|-----|------|
| Per diode | | | | | |
| V _{ESD} | electrostatic discharge voltage | IEC 61000-4-2 (contact discharge) | [1][2] | | |
| | PESD3V3L5UK | | - | 15 | kV |
| | PESD5V0L5UK | | - | 20 | kV |
| | PESD3V3L5UK PESD5V0L5UK | machine model | [2] | 400 | V |
| | PESD3V3L5UK PESD5V0L5UK | MIL-STD-883 (human body model) | - | 8 | kV |

[1] Device stressed with ten non-repetitive ESD pulses.

[2] Measured from pin 1, 3, 4, 5 or 6 to pin 2.

Table 7. ESD standards compliance

| Standard | Conditions |
|---|---------------------------------|
| Per diode | |
| IEC 61000-4-2; level 4 (ESD) | > 15 kV (air); > 8 kV (contact) |
| MIL-STD-883; class 3 (human body model) | > 4 kV |

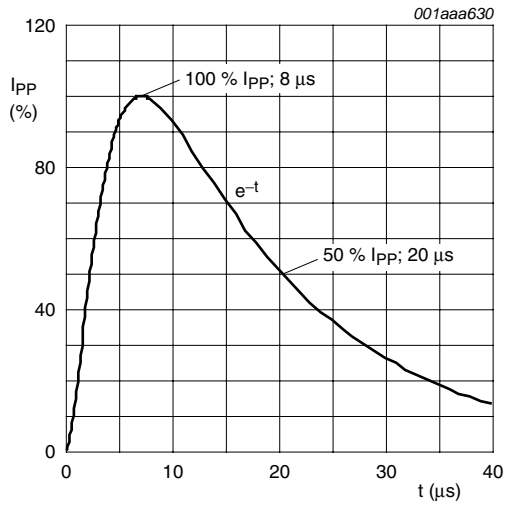


Fig 1. 8/20 μs pulse waveform according to IEC 61000-4-5

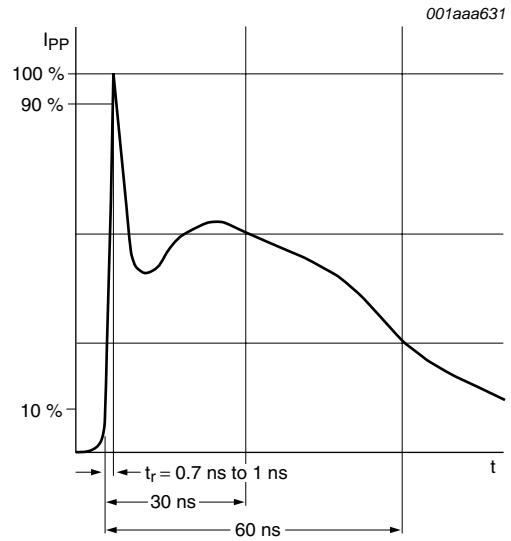


Fig 2. ESD pulse waveform according to IEC 61000-4-2

6. Characteristics

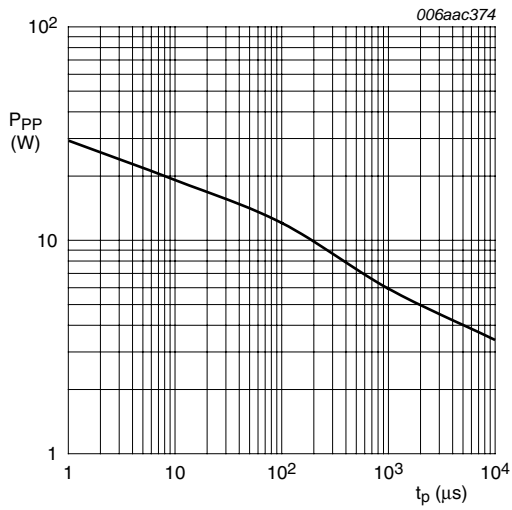
Table 8. Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|--------------------------|---|---|------|------|---------------|
| Per diode | | | | | | |
| V_{RWM} | reverse standoff voltage | | | | | |
| | PESD3V3L5UK | | - | - | 3.3 | V |
| | PESD5V0L5UK | | - | - | 5.0 | V |
| I_{RM} | reverse leakage current | | | | | |
| | PESD3V3L5UK | $V_{RWM} = 3.3\text{ V}$ | - | 0.4 | 2 | μA |
| | PESD5V0L5UK | $V_{RWM} = 5.0\text{ V}$ | - | 0.08 | 0.5 | μA |
| V_{BR} | breakdown voltage | $I_R = 1\text{ mA}$ | | | | |
| | PESD3V3L5UK | | 5.3 | 5.6 | 5.9 | V |
| | PESD5V0L5UK | | 6.47 | 6.8 | 7.14 | V |
| C_d | diode capacitance | $f = 1\text{ MHz};$ $V_R = 0\text{ V}$ | | | | |
| | PESD3V3L5UK | | - | 20 | 24 | pF |
| | PESD5V0L5UK | | - | 18.5 | 22 | pF |
| V_{CL} | clamping voltage | | [1] [2] | | | |
| | PESD3V3L5UK | $I_{PP} = 3.1\text{ A}$ | - | - | 9.5 | V |
| | PESD5V0L5UK | $I_{PP} = 3\text{ A}$ | - | - | 9.9 | V |
| r_{dif} | differential resistance | $I_R = 5\text{ mA}$ | | | | |
| | PESD3V3L5UK | | - | 5 | 16 | Ω |
| | PESD5V0L5UK | | - | 2.5 | 8 | Ω |

[1] Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.

[2] Measured from pin 1, 3, 4, 5 or 6 to pin 2.



$T_{amb} = 25\text{ °C}$

Fig 3. Peak pulse power as a function of exponential pulse duration; typical values

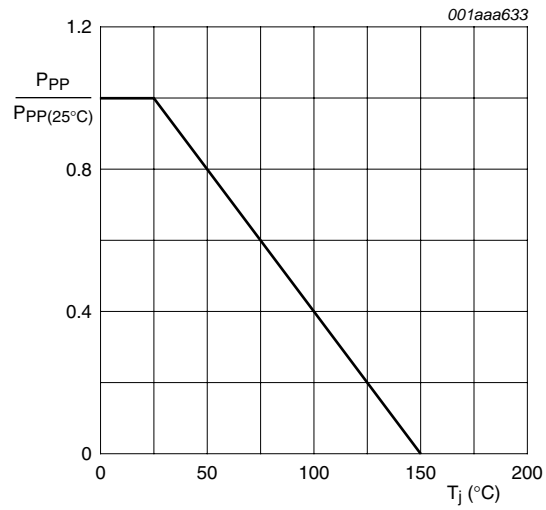
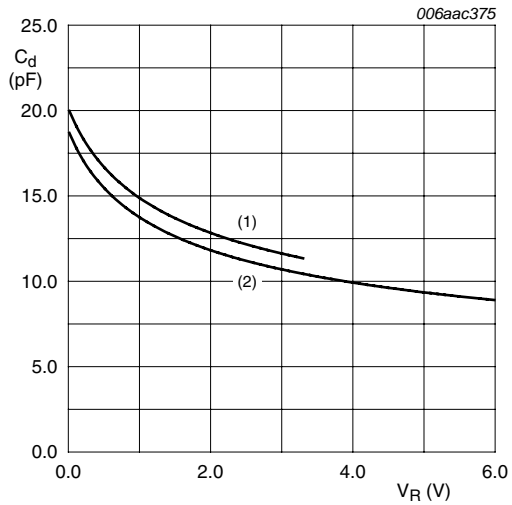


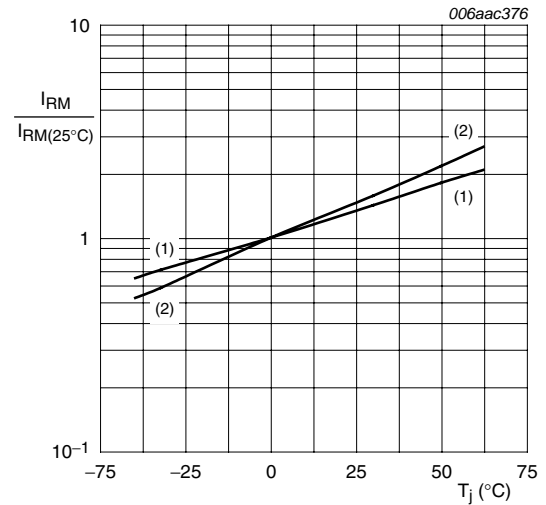
Fig 4. Relative variation of peak pulse power as a function of junction temperature; typical values



$f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$

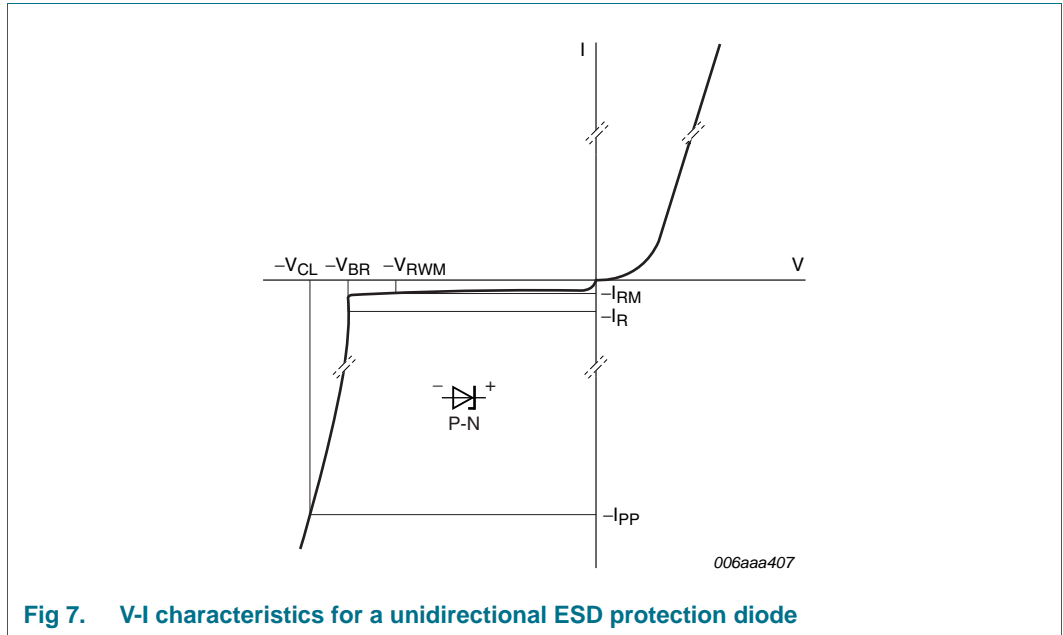
- (1) PESD3V3L5UK
- (2) PESD5V0L5UK

Fig 5. Diode capacitance as a function of reverse voltage; typical values



- (1) PESD3V3L5UK
- (2) PESD5V0L5UK

Fig 6. Relative variation of reverse current as a function of junction temperature; typical values



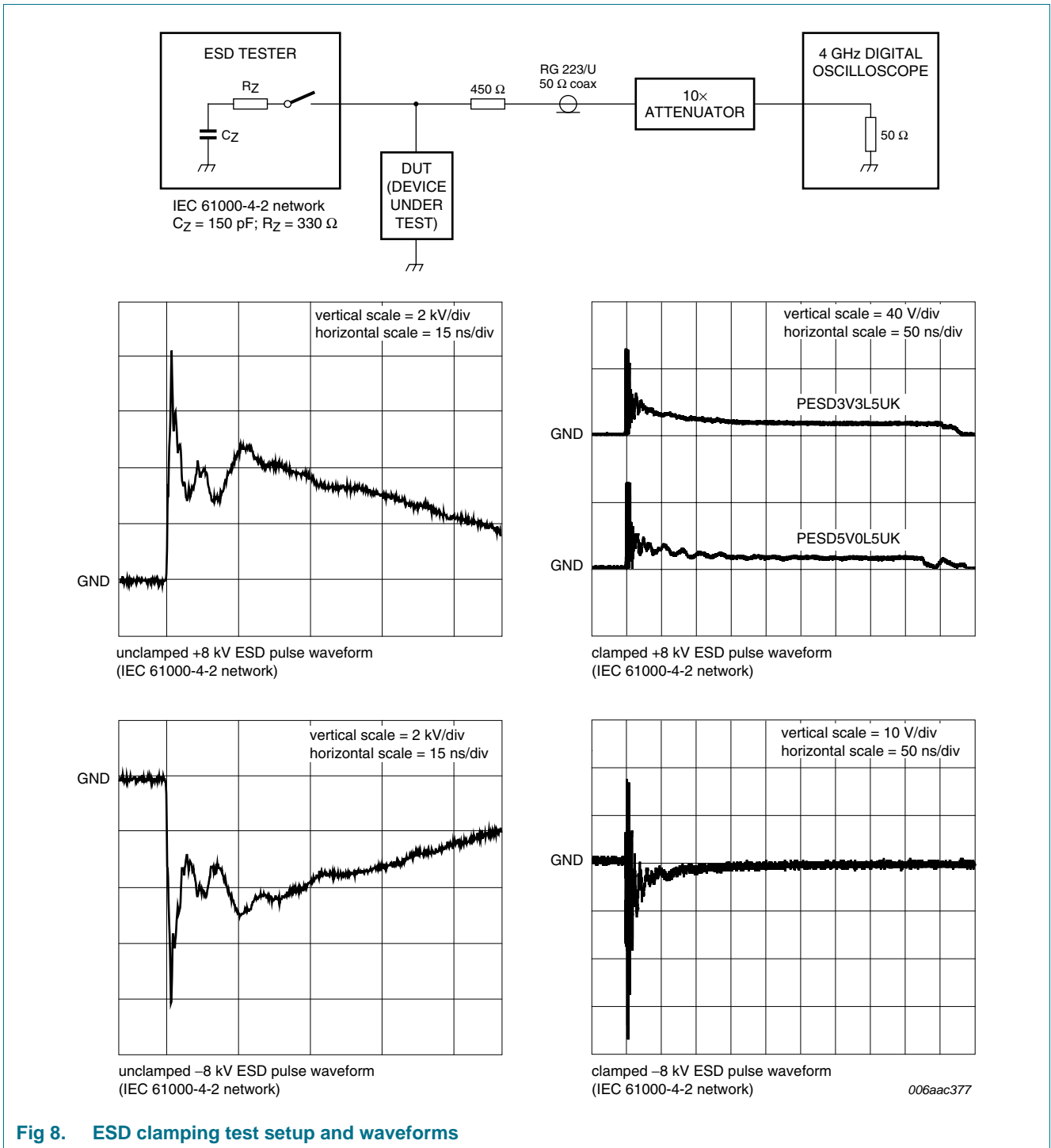


Fig 8. ESD clamping test setup and waveforms

7. Application information

The PESD3V3L5UK and the PESD5V0L5UK are designed for the protection of up to five unidirectional data or signal lines from the damage caused by ESD and surge pulses. The devices may be used on lines where the signal polarities are either positive or negative with respect to ground. The PESD3V3L5UK provides a surge capability of 28 W per line and the PESD5V0L5UK provides a surge capability of 30 W per line for an 8/20 μ s waveform.

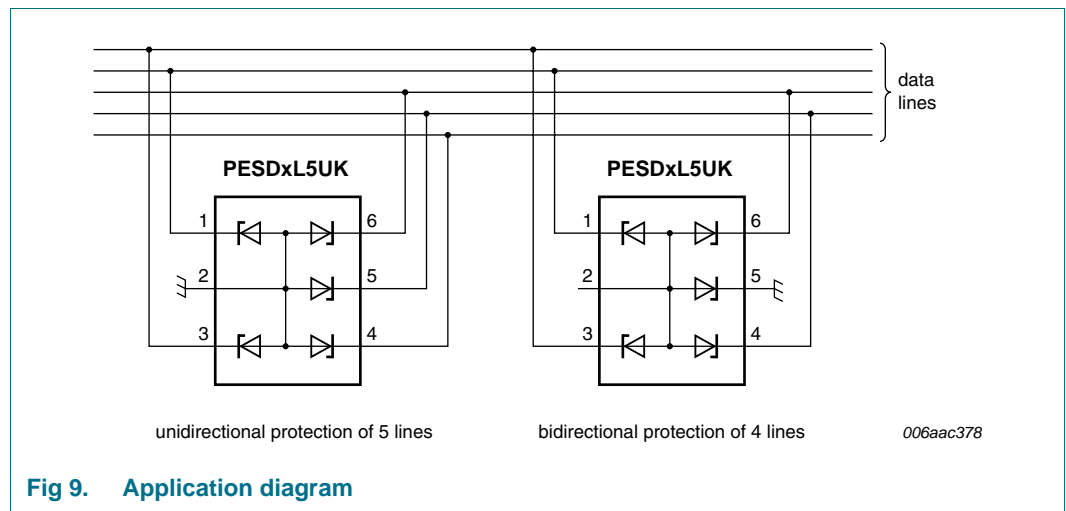


Fig 9. Application diagram

Circuit board layout and protection device placement

Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

1. Place the device as close to the input terminal or connector as possible.
2. The path length between the device and the protected line should be minimized.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
6. Minimize the length of the transient return path to ground.
7. Avoid using shared transient return paths to a common ground point.
8. Ground planes should be used whenever possible. For multilayer PCBs, use ground vias.

8. Test information

8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

9. Package outline

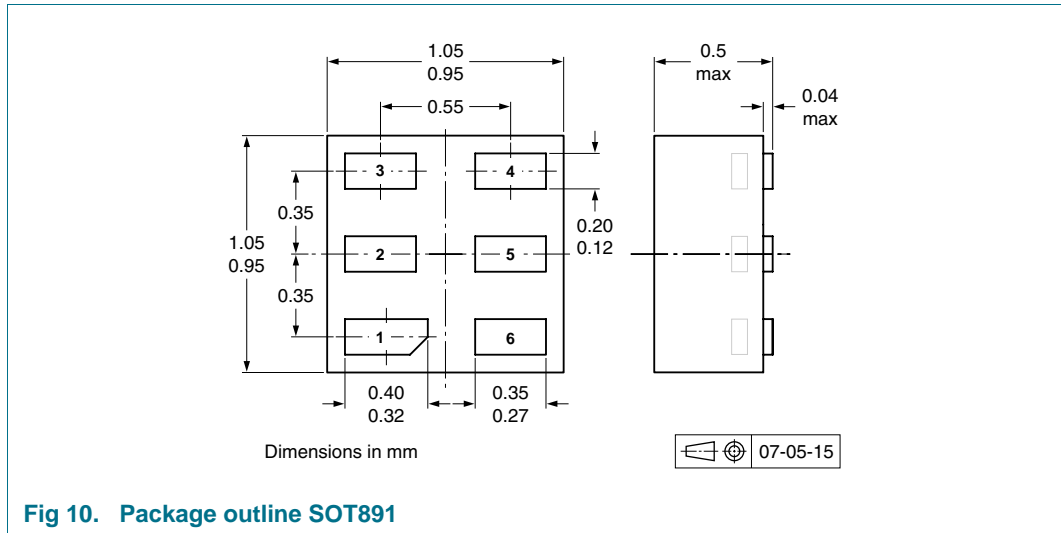


Fig 10. Package outline SOT891

10. Packing information

Table 9. Packing methods

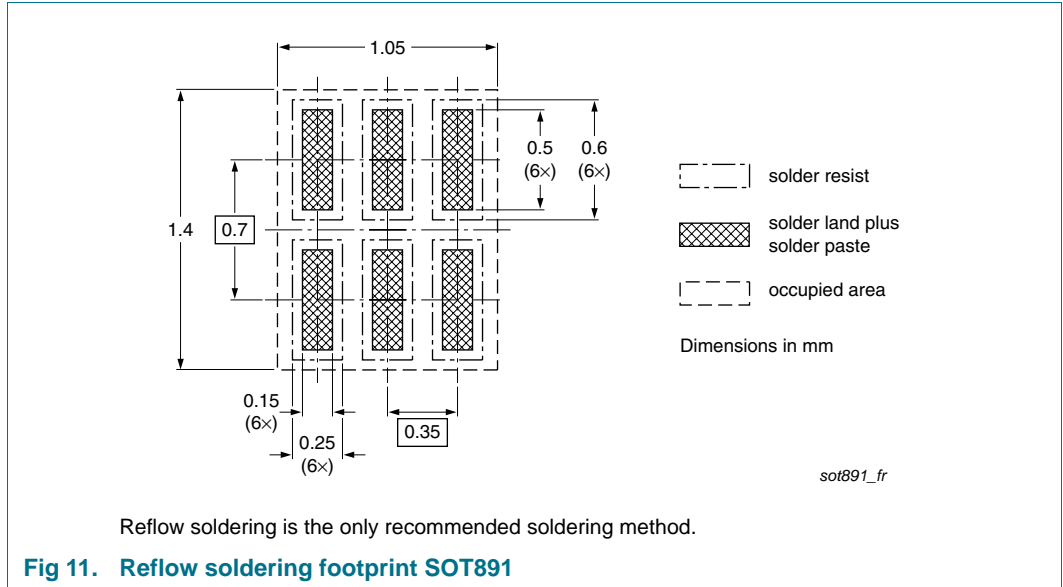
The indicated -xxx are the last three digits of the 12NC ordering code.^[1]

| Type number | Package | Description | Packing quantity |
|-------------|---------|------------------------------------|------------------|
| | | | 5000 |
| PESD3V3L5UK | SOT891 | 4 mm pitch, 8 mm tape and reel; T4 | [2] -132 |
| PESD5V0L5UK | | | |

[1] For further information and the availability of packing methods, see [Section 14](#).

[2] T4: 90° rotated reverse taping

11. Soldering



12. Revision history

Table 10. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------------------------|--------------|--------------------|---------------|------------|
| PESD3V3L5UK_ PESD5V0L5UK v.1 | 20100825 | Product data sheet | - | - |

13. Legal information

13.1 Data sheet status

| Document status ^{[1][2]} | Product status ^[3] | Definition |
|-----------------------------------|-------------------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
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